Offer #2023-07026

Post-Doctoral Research Visit F/M Reasoning on heterogeneous data

**Contract type**: Fixed-term contract  
**Level of qualifications required**: PhD or equivalent  
**Function**: Post-Doctoral Research Visit

### About the research centre or Inria department

The Inria Sophia Antipolis - Méditerranée center counts 34 research teams as well as 7 support departments. The center's staff (about 500 people including 320 Inria employees) is made up of scientists of different nationalities (250 foreigners of 50 nationalities), engineers, technicians and administrative staff. 1/3 of the staff are civil servants, the others are contractual agents. The majority of the center's research teams are located in Sophia Antipolis and Nice in the Alpes-Maritimes. Four teams are based in Montpellier and two teams are hosted in Bologna in Italy and Athens. The Center is a founding member of Université Côte d'Azur and partner of the I-site MUSE supported by the University of Montpellier.

### Context

This postdoc offer is part of a bilateral project between Inria and the DFKI (German Research Center for Artificial Intelligence), namely R4Agri (Reasoning on Agricultural Data: Integrating metrics and qualitative perspectives, 2022-2025).

Taking numerical agriculture as the targeted application domain, the overall goal of the R4Agri project is to provide a framework for reasoning about knowledge based on heterogeneous data, with a focus on multi-modal and multi-scale sensor data. Main challenges include context-dependent interpretation of sensor data, which involves reasoning about prior knowledge, and query answering techniques that exploit domain knowledge and accommodate the specificities of data sources in a flexible manner.

The postdoctoral researcher will be a member of the BOREAL team, which is a join team between Inria, the LIRMM (CNRS and University of Montpellier) and INRAE.

### Assignment

In collaboration with members of the BOREAL team and DFKI partners, the postdoc will contribute to the design and development of the targeted knowledge-based data access system. The architecture of this system is based on three levels: heterogeneous data sources, including sensor data, domain knowledge centered around an ontology, and mappings between the two. The knowledge representation and reasoning language will be based on first-order logic rules extended with computed predicates and default negation. For more detail, see the following demo paper: [https://hal-lirmm.ccsd.cnrs.fr/lirmm-04304601v1](https://hal-lirmm.ccsd.cnrs.fr/lirmm-04304601v1)

The post-doc is expected to work on methodological, theoretical and algorithmic issues, as well as on the implementation of use cases that demonstrate the practical interest of the techniques developed. This second aspect will be carried out in close collaboration with the other project members of the BOREAL team, in particular the engineer and the PhD student who have been recruited. Regular interaction with DFKI partners is also expected.

The following topics are of particular interest in the projet:

- combination of materialisation and virtualisation query answering techniques
- combination of qualitative spatio-temporal reasoning with rule-based reasoning
- query rewriting with rules that feature computed predicates and default negation
- design of mappings adapted to multimodal data fusion.

### Main activities

- Research  
- Exchange with the partners  
- Scientific paper writing
Skills

Technical skills and level required:

- excellent level in knowledge representation and reasoning, very good knowledge of data management, familiarity with semantic web languages
- programming languages: java (other languages like C++ or python is a plus)

Languages: a good level in English is required (spoken and written English).

Relational skills: enjoying teamwork, being able to convey scientific results in a clear and synthetic way

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking (after 6 months of employment) and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Remuneration

Gross Salary: 2653 € per month

General Information

- Theme/Domain: Data and Knowledge Representation and Processing
- Town/city: Montpellier
- Inria Center: Centre Inria d'Université Côte d'Azur
- Starting date: 2024-03-01
- Duration of contract: 12 months
- Deadline to apply: 2024-02-29

Contacts

- Inria Team: BOREAL
- Recruiter: Marie-Laure.Mugnier@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

The keys to success

The candidate will have a PhD relevant to reasoning on data, in the fields of knowledge representation and reasoning, databases or the semantic web, and a solid publication record.

Essential qualities in order to fulfil this assignment are enjoying teamwork and scientific exchanges.

Warning: you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

Applications must be submitted online on the Inria website. Collecting applications by other channels is not guaranteed.
The position is open to:
- Inria internal mobility, remuneration according to statutory conditions
- mobility from other public body, by posting for a period of three years, renewable, remuneration according to statutory conditions
- in short term contract from service fixed-term

**Defence Security:**
This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

**Recruitment Policy:**
As part of its diversity policy, all Inria positions are accessible to people with disabilities.